

Homeowners: Solar Station, Solar Fluid and Expansion Vessel

From RVR

Solar Station, Solar Fluid and Expansion Vessel

The Solar Station, Expansion Vessel and Solar Fluid are essential components in a solar heating system.

The Solar Station

The solar station is like the heart and mind of the solar system. It performs many important functions.

Solar controller

The solar station contains the solar controller. This controller has the task of monitoring the temperature of the solar panels and the tank they are connected to. It can do this as it is connected to temperature probes both at the panels and at the bottom (and sometimes top) of the tank.

Because the controller monitors the temperature difference between the panels and tank, there is no need for the solar fluid to be continuously pumped. When the panels are hotter than the tank, then it makes sense for the controller to switch the pump on. However, if the panels become cooler than the tank then it turns the pump off. This is important because it saves running costs as well as preventing the loss of heat from the tank out through the panels.

If the optional temperature sensor is connected to the top of the tank and the controller is configured for it, the solar controller has the ability to bring on the supplementary heat source automatically if there is not enough solar heat available.

In most systems the solar controller has an appealing graphical readout so that the homeowner can see the temperatures of the various system sensors, as well as a log of how many hours the pump has been running etc.

Pump

The solar station contains the solar pump, which is connected to the controller. This is used to circulate the solar fluid up around the panels and back down through the tank. These pumps are generally very low wattage and use little electricity while they operate.

Filling and commissioning the system

Solar stations from RVR contain all the necessary plumbing fittings required for filling the system, adjusting the flowrate, commissioning the installation and attaching the expansion vessel.



A Flowcon S solar station



A Resol BS Controller



A Wilo Pump

Solar Fluid

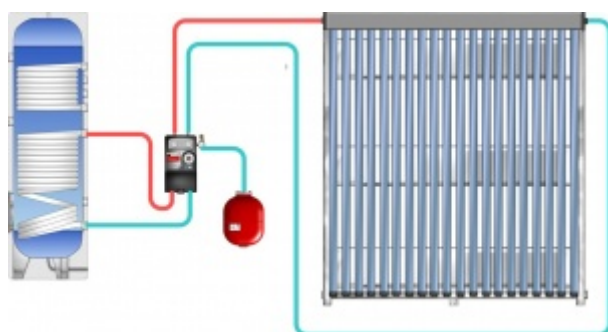
The solar fluid is another critical part of the solar system. Some systems use water but all RVR systems are designed to use a mix of 40% Propylene Glycol antifreeze and water.

There are three reasons for this:

1. Propylene glycol has a higher boiling point than water. What this means is that it can be circulated for longer before it boils and so can carry more heat to the cylinder from the panels
2. The glycol mixture provides freeze protection for the panels during cold weather
3. Propylene glycol is non toxic as it is a food grade of antifreeze. This is important in case a coil or pipe should ever leak.



Expansion Vessel



All solar heating systems supplied by RVR are designed to run as a closed / sealed circuit. This means that the solar fluid should never leave the circuit and should not need to be topped up under normal operation.

As it heats up, the solar fluid expands. In periods of very hot weather, when the water in the tank is not being used, the energy being collected from the panels has nowhere to go. This is known as stagnation. The solar fluid gets so hot that it boils and vapourises, and any energy hitting the panel has nowhere to go and is immediately lost back to the atmosphere. This is by design.

To cope with this, the solar circuit needs to be fitted with an expansion vessel. This expansion vessel contains a membrane which works like a balloon. As the solar fluid expands, the membrane expands and allows the solar fluid to flow into it. As the fluid contracts, so does the membrane, and the fluid returns into the pipework as normal.

For this reason it is essential that an expansion vessel is sized correctly. If the expansion vessel is too small, the pressure relief valve in the system will open and the fluid will be safely discharged into a drain. In this situation the solar system would have to be re-filled and re-commissioned.

Further Reading

You can read about roof components and piping here: [Homeowners:Solar Roof brackets, Pipework and Roof Flashings](#)

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